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National Vegetable Industry Centre Newsletter

Pollination and Honey Bees

Gerard Kelly, NSW DPI, Dareton

The use of honeybees for pollination of horticultural crops is well documented. In vegetable growing regions such as the Riverina, Sunraysia and Central Tablelands, bee hives are essential for pollination of many vegetable crops including cucurbits such as melons, pumpkins, zucchinis and cucumbers. Pollination of crops by honey bees offers benefits including increased yields and improved fruit quality. Apiarists can advise best management options for bee hives in crops including;

- timing of hive introduction into crops
- placement of hives to avoid competition from nearby flowering crops
- stocking rates for specific crops
- care with the use of pesticides applied to crops

Threats to honey bees and pollination services

Exotic threats to Australian honey bees include Varroa mite (*Varroa destructor & Verroa jacobosni*), *Tropilaelaps clareae* mite, tracheal mite (*Acarapis woodi*) and Asian honey bees *Apis dorsata & Apis cerana*.

Invasion by Varroa mite poses the biggest risk and most serious threat to honey bees and Australian horticultural crops. Varroa mite has already been found in New Zealand and Papua New Guinea, the two most likely places from which it could enter Australia. Asian honey bees were also discovered in north-eastern Australia in 2007. They are a pest to Australia's honey and agricultural industries as they are a natural host for Varroa mite and a vector for other bee diseases and pests. They also compete with honey bees for floral resources and rob honey from managed bee hives, which may cause hives to die from starvation. The Australian Government recently advised they will extend a program to eradicate Asian honey bees from north-eastern Australia.

Threats to honey bees and the supply of pollination services by exotic and introduced pests and diseases prompted the formation of the Australian Pollination Alliance. The Alliance, with support from the Australian government and horticultural industries, has undertaken several research and development projects and activities to address these threats. The vegetable industry and the melon industry has supported some specific projects with funds.

Projects already completed;

- Future surveillance needs for bee biosecurity (MT08044) - Developed a national surveillance program to underpin border surveillance and a post incursion response.
- Simulation exercise for the pollination industries (MT08048) - A simulation exercise on how the pollination sector would respond to a pest incursion and its aftermath.
- Pollination Aware: its importance to Australia (MT09079) - Produced the Pollination Awareness Manual which includes production areas, volumes and values and dependence on pollination.
- Protecting Pollination; Communication Awareness (MT09083) - Produced a video ‘Honey bee blues’ which outlines the toll industrial agriculture and habitat destruction and varroa mite have taken on honey bee populations everywhere except Australia.

Pollination research and development is continuing and future projects are planned. The Pollination R&D Program is driven by the following objectives (with anticipated shares of the annual program budget);

- Incursion risk minimisation - for early detection of a threat to pollination service supply - (10%)
- Improving the effectiveness and economic return from pollination - living with Varroa - (20%)
- Resource access - landscape and nutrient management for effective pollination - (10%)
- Pest and disease management - to ensure the ongoing supply of pollination services - (45%)
- Reducing crop dependence on honeybees - native pollinators and self-pollinating crops - (5%)
- Communication - including pollination education, extension and capacity building - (10%).

Honey bee
(NSW DPI)

Mid-Season Capsicum Variety Trial

Stephen Wade, NSW DPI, Bathurst

The search for capsicum varieties better suited to Australian conditions remains an industry priority. To assess their suitability for processing, a mid-season capsicum variety trial (see Table 1) was planted near Cowra as part of a series of capsicum variety trials conducted over the 2009/10 growing season.

Table 1. Mid-season capsicum trial varieties.

Variety	Seed Company	Growth Habit	Fruit Size	Fruit Shape	Skin Colour
Aries	Seminis	semi-compact	large	half long	green to red
Denison	Terranova Seeds	vigorous	large	blocky	green to red
Lestat	South Pacific Seeds	vigorous	large	blocky	green to red
Raptor	S&G	vigorous	large	half long	green to red
Red Square	S&G	compact	large	blocky	green to red

The trial was transplanted on the 3rd December, 2009. It was sited on a brown, silt loam soil on the Lachlan River floodplain. The capsicums were transplanted onto 0.76 m wide rows, with 0.3 m spacing between plants. The transplants were established with sprinklers and then watered by furrow irrigation. Normal commercial practices were followed over the growing season. The trial was harvested 92 and 97 days after transplanting on the 4th and 9th March, 2010. No statistical differences were found between the varieties for any of the trial crop yields or fruit traits (see Tables 2 & 3). The trial showed that with two pickings an average processing fruit yield of 16.4 t/ha could be harvested from a mid-season capsicum crop. For further information on the mid-season capsicum variety trial, please contact Stephen Wade, District Horticulturist (Vegetables), Bathurst Primary Industries Centre, on (02) 6330 1216.

Lestat capsicums – (South Pacific Seeds).

Table 2. Mid-season capsicum variety trial crop yields.

Variety	Total Yield (t/ha)	Processing Fruit (t/ha)	Small Fruit (t/ha)	Medium Fruit (t/ha)	Large Fruit (t/ha)
Lestat	44.5 a	22.4 a	15.2 a	7.2 a	0.0 a
Aries	44.5 a	19.2 a	11.8 a	7.4 a	0.0 a
Red Square	46.5 a	17.3 a	14.6 a	2.7 a	0.0 a
Denison	42.5 a	12.9 a	8.1 a	4.8 a	0.0 a
Raptor	21.5 a	10.1 a	5.7 a	4.4 a	0.0 a

Total Yield – yield of all fruit ≥ 50 g weight.
Processing Fruit – yield of green, 140-330 g fruit.
Small Fruit – yield of green, 140-200 g fruit.
Medium Fruit – yield of green, 200-300 g fruit.
Large Fruit – yield of green, 300-330 g fruit.
a – *least significant difference rank (P > 95%).*

Table 3. Mid-season capsicum variety trial fruit traits.

Variety	Fruit Weight (g)	Fruit Length (mm)	Fruit Width (mm)	Fruit Wall (mm)	Fruit Brix (°B)
Lestat	185 a	73 a	86 a	7.2 a	3.6 a
Aries	189 a	102 a	82 a	6.1 a	3.7 a
Red Square	170 a	92 a	77 a	6.0 a	3.8 a
Denison	193 a	75 a	88 a	7.3 a	3.7 a
Raptor	184 a	100 a	77 a	6.3 a	4.1 a

Fruit Weight – average weight of processing fruit.
Fruit Length – average length of processing fruit.
Fruit Width – average width of processing fruit.
Fruit Wall – average skin thickness of processing fruit.
Fruit Brix – average soluble solids of processing fruit.
a – *least significant difference rank (P > 95%).*

Potato Cyst Nematodes and the National Management Plan

Tony Napier, NSW DPI, Yanco

Potato cyst nematodes (PCN) are a major soil pest of potatoes and found in 65 countries around the world. PCN has been known to be in Australia for the last 25 years when it was first found in Western Australia. It has since been found in Victoria when it was discovered at Wandin in 1991. Other districts in Victoria to become infested with PCN include Gembrook, Keysborough, Rosebud (1992), Kooweerup (2004) and Thorpdale (2006). Western Australia have conducted an eradication program which has been successful and are now free of the pest.

PCN are a very small pest but can cause a big problem. When PCN first infest a paddock they are found in small patches which become larger with every new crop. They attack potato roots which result in infected plants turning yellow and wilting. The yield reduction is only small to begin with but the yield loss will increase each year as the infestation of PCN increases. You can expect yield losses of about 9% before you notice any symptoms in the field, which is mainly due to a reduction in average tuber size. When a field becomes heavily infested you can expect a yield loss of over 60%.

A national plan has been developed to manage PCN in Australia and sets out a national harmonised protocol for its control, management and mitigation. The plan is designed to minimise the spread of PCN and to maintain Australia's status of being largely free of the pest. The PCN management plan was drafted following a pest risk analysis in 2008 and after consultation with industry and government it was submitted to AUSVEG and the Commonwealth in October 2010.

<u>The PCN plan recommends the following:</u>

- Defining land into three risk categories which include infested land as the highest risk, linked land as a high risk and non-linked land as the lowest risk
- Guidelines to register infested and linked land
- The mandatory use of resistant varieties on infested land
- No seed movement from infested or linked land
- Mandatory PCN testing for certified seed
- A comprehensive PCN hygiene strategy for on-farm biosecurity
- Standards for grading, brushing and washing ware and processing potatoes to minimise soil attachment
- Tracing system for ware potatoes into the market from infested and linked land
- Conduct a national surveillance program of 10% of land to prove property freedom. If no PCN is detected in a region, the surveillance will justify access to PCN sensitive markets. If PCN is detected in a region, the plan will allow growers to continue growing without some of the unnecessary prohibitions of the past

PCN on potato roots – (NSW DPI)

The National Management plan is only in a draft form and needs the whole industry to agree on its content before it can be adopted by industry. AUSVEG held ten grower consultation meetings in early March to help finalise the management plan. The first consultation meeting was held at Wagga Wagga with a number of key growers and processor representatives on hand to give comment. The meeting was chaired by AUSVEG with presentations from Doris Blessing and David Beardsell. It was generally agreed by growers at the Wagga meeting that a national plan was desirable but it was difficult to understand in its current form and there was some anxiety about various sections of the plan. The section that gave growers the most concern was the surveillance recommendation and the cost of implementation. The current standard for surveillance involves collecting soil in the field on a 10m x 10m grid and sending it to a laboratory for testing. Growers at this meeting were keen to examine other methods of soil collection including collecting the soil under grading tables. Growers also stated they did not want a plan they could not conform to and like any plan, this one needs to be practical and economical.

A further nine grower consultation meeting were held across Australia and included the states of Queensland, South Australia, Western Australia, Victoria and Tasmania. At the end of the consultation process, many growers had a better understanding of the proposed plan and David Beardsell was able to get some valuable feedback. David is now updating the plan and preparing to report back to AUSVEG.

New Activity Group Codes for Fungicides

Andrew Watson, NSW DPI, Yanco

Pesticides used in Agriculture have always been classified into groups. This grouping provides important information for resellers and users on what the pesticide characteristics are and its mode of action. The allocation to groups also assists in identifying potential risks of resistance developing in organisms. It is an important responsibility by end users to rotate pesticides to reduce exposure of the target organism to the one pesticide. Not all pesticides have high risks of the development of resistance in the target organism. Generally multi site fungicides are the protectant type of fungicides and have a lower risk of resistance development. Multi site fungicides include sulphur, copper, mancozeb and chlorothalonil. However there have been instances recorded where some bacteria have developed some tolerance to copper products.

Single site products have a higher risk of inducing resistance to develop in the target organisms. Plant pathogens that have a high risk of developing resistance in vegetables include downy mildew and powdery mildew in cucurbits, late blight in potatoes and grey mould in a range of crops. The use of products from a range of groups reduces the potential of resistance developing in specific pests and diseases.

CropLife Australia is the industry peak body that consists of representatives of agricultural chemical and biotechnology companies. CropLife Australia progresses the interests of member companies by addressing industry issues with various stakeholders, by negotiating with government bodies and assisting with the implementation of government policies. CropLife Australia has completed a review of the Australian Fungicide Activity Groups classification system. The fungicides still have the same active ingredients but the codes for the groups have changed. The codes used to run from A to Y but now run from 1-40 for site of action specific fungicides and M, M1…M9 for the multi- site active fungicides. Product labels need to have the new codes before October 2011.

For a complete list of the new activity grouping, visit their website at:
www.croplifeaustralia.org.au/files/resistancemanagemen/fungicides/2010%20Fungicide%20Activity%20Group%20Table.pdf

CropLife Australia has listed numerous recommendations for fungicide resistant management in a range of crops on their website. An example of a fungicide resistant management strategy is for the control of downy mildew in cucurbits which involves rotating with a range of different fungicides groups. It is recommended to start disease control early and maintain a regular program using a fungicide from groups other than Group 4, 11 or 40. When conditions favour disease development, DO NOT wait for disease to appear, but apply two consecutive sprays of a Group 4 or 11 product, or a single spray of a Group 11 fungicide. Then resume the program of sprays using products from a different group to the Group 4, 11 or 40 products just applied. Continue alternation of fungicides between successive crops.

For more detail on their recommendation on all crop diseases, visit their website at:
www.croplifeaustralia.org.au/files/resistancemanagemen/fungicides/2010%20Fungicide%20Resistance%20Management%20Strategies.pdf

2010/11 Processing Tomato Season

Liz Mann, Industry Development Manager, APTRC

Tomato harvester – (NSW DPI)

Who would have thought that the region would go from drought to floods in a matter of months? This has drastically impacted upon the industry, with many growers now saying that they much preferred the drought! At the start of the season the Australian industry consisted of 22 growers planning to produce 287,500 tonnes, with an estimated farm gate value of approximately $31.6M. Due to heavy rain during planting the total planted area was slightly reduced to 2,796 ha. Based on the average yield of 95 t/ha (same as the 2009/10 season) a total tonnage of 265,600 would have been achievable for the industry at that time. This estimate has now dropped to below 90,000 tonnes at a farm gate with a value of less than $10M. The total estimate of loss of production from flooding and heavy rain in Victoria is over $15.7M, and NSW over $4.9M. 19 growers are located in Victoria and three growers in NSW.

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